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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/589,376

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EXAMINER

KOSAR, AARON J

ART UNIT

PAPER NUMBER

1651

MAIL DATE

DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/589,376	Applicant(s) MIYAKE ET AL.	
	Examiner AARON J. KOSAR	Art Unit 1651	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 July 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 7-11, 13 and 15-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 7-11, 13 and 15-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

Applicant's amendment and argument filed July 26, 2010 in response to the non-final rejection, are acknowledged and have been fully considered. Any rejection and/or objection of record not specifically addressed is herein withdrawn.

Claims 7-11, 13, and 15-21 are pending and have been examined on their merits.

Claim Objections

Claims 9, 10, and 18 are objected to because of the following informalities:

The term "potion" in claim 18, line 2 appears to be an inadvertent typographical error of the term --portion--.

In claims 9 and 10 the phrase "has a concavoconvex shape with concavoconvex" appears to be an inadvertent typographical error of the phrase --has a concavoconvex shape with the concavoconvex".

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 7-11, 13, and 15-21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 7 recites a cell, a first cell, a second cell, and/or a plurality of cells; however, it is unclear if the “cell” in the phrases “adhesion to a cell” (lines 10-11), “a cell in the center of the cell culture region” (line 19), “the cell does not adhere” (line 20), and “the cell is cultured” are the same cell(s) as any one or more of the terms “a cell”, “a first cell”, “a second cell” and “a plurality of cells” or if different cells are intended. Furthermore, it is unclear if the “first cell” and the “second cell” is a difference in number only (e.g. first and second HUVECs) or if also a difference in cells is embraced/excluded by the claims (e.g. a first human epithelial cell and a second human non-epithelial cell). Claims 11 and 21 also recite various “cell” terms and thus are included in this ground of rejection for the reasons argued for claim 7 above. Clarification is required.

Claim 7, 11, and 21 recite that the substrate comprises a cell culture “region” on the base material which contains a cell adhesive “layer” (e.g. claim 7, at lines 3-4) and a cell adhesion “portion” (e.g. claim 7, at line 9); however, it is unclear how the terms are cooperatively interrelated in the cell-free substrate and it is further unclear which of the region(s), layer(s),

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portion(s), or portions of the portion(s), if any, are intended to provide the cell-adhesion in a cell-adhered substrate. Clarification is required.

Claim 7 at line 14 “a first cell adhesion portion” and at line 14-15 “a second cell adhesion portion”; however, it is unclear if the terms are intended to be further limiting of the “cell adhesion auxiliary portion”, the “plurality of portions” of the cell adhesion auxiliary portion, or if another interpretation is intended. Clarification is required.

Claim 7 at line 20 recites that the cell culture region “becomes insufficient”; however the object as to what the region becomes “insufficient” is unclear. Clarification is required.

Claims 7 (at line 20) and 21 (at lines 20-21) recites the phrase “the cell culture region which does not contain the cell adhesion auxiliary portion”; however, the phrase is unclear because claims 7 and 20 (each at lines 8-10) each recite that in the patterning substrate “the cell culture region comprises:...a cell adhesion auxiliary portion” and it is unclear if Applicant intends for the cell-adhesion auxiliary portion in the composition or if it is merely exemplary. Clarification is required.

Claims 9-11 recite the phrase “a planar view”; however the reference object(s) having a planar view is not recited and thus it is unclear what object(s) Applicant intends by the phrase. Clarification is required. Please note however, this ground may be overcome for example by reciting the planar-viewed object, for example, a planar view of the patterning substrate.

Claim 11 at lines 3, 5, 7, 12-13, and 15 recites the terms/phrases “a cell”, “the cell”, “a plurality of cells”, “the cells”, and “a cell”; however it is unclear if the terms/phrases are the same or different cells. Clarification is required.

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Claim 11 at lines 15-17 recites the phrase “when the boundary...is in a straight line”. It is unclear if the phrase is required of the substrate or merely exemplary. Clarification is required.

Claim 11 at lines 15-16 recites the phrase "cannot arrange regularly"; however it is unclear what Applicant intends by the phrase, the specification does not expressly define regular arrangement for all cells embraced by the genus of the claim, and one of skill would not be apprised as to what arrangements are thus included or excluded by the phrase. Clarification is required.

In claims 17-20 the claims recite the phrase “is capable of being decomposed or denatured by the action of a photocatalyst upon irradiation with energy”; however, it is unclear in each instance of the phrase if Applicant intends for the phrase to further limit the “layer” or “portion”, the “material” contained therein, or if another interpretation is intended. Clarification is required. Please note, for example this ground with respect to the phrase recited in claim 17 may be overcome, by reciting further enumerated or indented phrases for example in claim 17 by reciting the phrase --wherein the cell adhesive material (i) has cell adhesive properties and (ii) is capable of being photocatalytically-decomposed or –denatured-- or other appropriate amendment.

All other claims depend directly or indirectly from the rejected claims and are, therefore, also rejected under 35 USC § 112, second paragraph, for the reasons set forth above.

Response to Arguments

Applicant has argued that features of the invention are as shown in Figures 2 and 3 and the “portions” identified therein by label identifiers (2) and (3). Applicant has also argued that the “material” clarifies the object/subject of photocatalysis. Applicant's arguments have been fully considered; however they are not persuasive of error over the instant grounds of rejection.

In response to Applicant's arguments regarding showing certain features and portions of applicant's invention, it is noted that the features upon which applicant relies (i.e., Figures 2 and 3, and the portions/identifiers thereof) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

In response to Applicant's argument that the material is clearly identified as the subject of photocatalysis, this is not persuasive for the reasons of record and for the instantly argued reasons of the rejections above.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names **joint inventors**. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 7-11, 13, and 15-21 stand as rejected as obvious over Singhvi (U.S. Patent No. 6,368,838 B1).

A patterning substrate composition comprising a base material having cell culture and a non-culture region is claimed. Additionally, the claims are drawn to a patterned substrate having an inter/intra concave:convex distances of 0.5-10 μm .

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Singhvi teaches a substrate comprising a baseplate or substrate and a plurality of cytophilic/biophilic islands isolated by cytophobic/biophilic regions (see whole document, e.g. abstract; figure 1). Singhvi also teaches an array grid formed from a linear template, including an electron microscopy grid or parallel lines or from any corrugated pattern and that the pattern may be obtained from photolithography (e.g. column 4, lines 54-67; column 22, examples 1 and 3).

Singhvi does not teach a preferred combination of shape, dimension, or pattern of the cell-binding and cell-nonbinding regions as instantly claimed (e.g. 0.5-10 μm).

It would have been obvious to a person of ordinary skill in the art at the time the instant invention was made to have provided a substrate having the features of: 0.5-30 μm distances, concavoconvex shapes, and/or linear arrangements. It would have been obvious to have provided a plate/substrate having the features of 0.5-30 micrometer distances, concavoconvex shapes, and/or linear arrangements (herein referred to collectively as “the preferred features”), because Singhvi teaches manipulations of the morphology of the patterned plate.

One would have been motivated to modify the plate to have the preferred features, because Singhvi teaches configurations and methods of modifying the configurations, including: (1) adjusting to vary the island size relative to the desired cell dimensions, including teaching of 20 micrometer white blood cells and 1 micrometer *Xenopus* oocytes (column 12, ¶3-4); (2) adjusting an island area or shape, including “any size or shape, including rectilinear, circular, ovoid, and arbitrary shapes” (column 11, ¶ 3, emphasis added); and arranging in [linear] arrays, including grids wherein “irrespective of the shape of the islands, a pattern consisting of an array

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of islands is referred to as a grid”, parallel lines (column 11, ¶ 3-4; figure 1), or corrugated pattern (that is folded or parallel and alternating-ridge-and-groove shapes including a concavoconvex corrugation).

One would have had a reasonable expectation of success in making the composition having the preferred features, because the alteration of a micro array for cell adhesion and the modes of manipulation thereof are taught by Singhvi and the selection and optimization of a particular arrangement would be well within the purview of the skilled artisan.

Additionally, Singhvi is relied upon for the reasons discussed above. If not expressly taught by Singhvi, based upon the overall beneficial teaching and methods provided by this reference with respect shapes, sizes, and arrangements of the islands in the manner disclosed therein, including the teachings of using shapes with curvature (concave or convex, e.g. patterning with circular and ovoid shapes or corrugated patterns) and providing instruction on tailoring islands and spacer regions to a cell morphology, the selection of a particular shape and arrangement of islands and spacer regions (cell adhesion, non-adhesion, and/or adhesion-inhibiting regions) is deemed merely a matter of judicious selection and routine optimization which is well within the purview of the skilled artisan.

In light of the forgoing discussion, the Examiner concludes that the subject matter defined by the instant claims would have been obvious within the meaning of 35 USC 103(a). From the teachings of the references, it is apparent that one of ordinary skill in the art would have had a reasonable expectation of success in producing the claimed invention.

Therefore, the invention as a whole was *prima facie* obvious to one of ordinary skill in the art at the time the invention was made, as evidenced by the references, especially in the absence of evidence to the contrary.

Response to Arguments

Applicant has argued that the instant invention teaches a cell culture auxiliary portion effecting an “excellent” arrangement of cells even when the cell culture patterning substrate comprises the cell culture region; teaches away from an arrangement “becomes insufficient” or a cell “does not adhere in the center” ; does not teach a straight line boundary or a straight line boundary sufficient to preclude cells from arranging regularly; and that the prior art teaches away from an area in which a cell does not adhere in the center when the cell is cultured in a region which does not contain the cell culture adhesion auxiliary portion. Applicant's arguments have been fully considered but they are not persuasive of error over the grounds of rejection for the reasons of record and for the following reasons.

In response to Applicant’s argument that the substrate attains the effect of making the arrangement of cells excellent, this is not found to be persuasive because the claims are drawn to a product (composition) and not to a method of making cells or an “excellent” arrangement thereof. Since the device as-claimed is rendered obvious by Singhvi which for the reasons of record would thus meet or render obvious the physical and structural limitations thereof, then the expectation is that the substrate rendered obvious by Singhvi would intrinsically perform for the instantly-claimed intended use, especially absent objective evidence to the contrary or evidence to the criticality of some undisclosed features.

Furthermore, since the arrangement of cells having excellence versus those which would not qualify as excellently arranged is not disclosed or recited in the instant claims, then the as claimed arrangement(s) is/are still broadly and reasonably interpreted as embraced by or rendered obvious by the arrangements of Singhvi, and for the reasons of record.

In response to Applicant's argument that Singhvi teaches away from an arrangement "becomes insufficient" or a cell "does not adhere in the center" when the cell is cultured in the cell culture region, this is not persuasive, because cells of Singhvi which "do not bridge" or which are "likely to peel off from the surface" broadly and reasonably are interpreted as an insufficiency or non-adherence as-claimed and thus still render obvious the claims. Furthermore, for the reasons of record, Singhvi teaches "cells...are allowed to form bridges across the cytophobic regions and contact each other" (that is , the composition is capable of providing cell-cell contact across nonbonding portions to culture/form a tissue; see whole document, e.g. Abstract); that the composition may be provided with any pattern, e.g. a corrugated-, micromachined-, or photolithographed-pattern and having dimensions of about 10 to about 0.25 μm (concavoconvex successively formed, 0.5-10 μm width) (e.g. columns 4-7, esp. col. 4 lines 54-67 and col.7 lines 2-5), and thus the structure of Singhvi still renders obvious the pattern and dimensions thereof, as instantly claimed.

In response to Applicants argument that Singhvi teaches away from an area in which a cell does not adhere in the "center" when the cell is cultured in a region of the cell culture region which does not contain the cell culture adhesion auxiliary portion, this is not persuasive because the cell culture region as instantly claimed contains the cell adhesion auxiliary portion and

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because the “cell culture region” is not limited by any dimension and thus a cell placed therein is broadly and reasonably interpreted as being in some way centered in the cell culture region.

In response to Applicant's argument that Singhvi does not teach a straight line boundary or a straight line boundary sufficient to preclude cells from arranging regularly, this is not persuasive because the claimed substrate is inclusive of cell-adhered concavoconvex materials, the concavoconvex shapes having right angles (that is, a series of linear segments (each segment broadly and reasonably interpreted as an individual line region)) and/or because Singhvi teaches any shape, including corrugated (folded/concavoconvex) patterns and optimizing the sizes/dimensions. Please note the differences in optimized size or shape between the prior art and instant claims, absent a basis for the criticality of a specific claimed limitation and absent a showing of the criticality commensurate with the claims, are thus insufficient to distinguish the claimed composition(s) over the compositions rendered obvious by the prior art. Accordingly, the compositions rendered obvious by the prior art which are within the scope of the instant claims and outside of a showing of criticality, are still obvious over the non-critical combinations/compositions/configurations lacking a showing of criticality thereof (see also MPEP 2144.04 (IV)(A)-(B)). Furthermore, in the interest of expediting prosecution, it is noted that the basis for the alleged criticality of the claims - which claims are drawn to a broad and diverse genera of configurations, materials, and to use with any cell – does not have support in the original disclosure commensurate therewith, in which is disclosed only a single DMEM-cultured human cell-isolate species (HUVECs) and dimensions of the substrate configured relative to intended culturing and patterning of these HUVECs.

Conclusion

No claims are allowed.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to AARON J. KOSAR whose telephone number is (571)270-3054. The examiner can normally be reached on Monday-Thursday, 7:30AM-5:00PM, ALT. Friday,EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mike Wityshyn can be reached on (571) 272-0926. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Aaron J Kosar/
Examiner, Art Unit 1651

/Christopher R. Tate/
Primary Examiner, Art Unit 1655